Statement of research : Adam Moroz

Past Research

Field of Research	Details
Biophysics	Planning and conducting NMR, ESR, IR, UV spectroscopy of proteins (Hb, Alb. RibonucleaseA), different metabolites (aldehydes, amino acids) and their complexes. The modification of active sites. Applied Variation and Optimal Control approaches to biological and physical extreme problems.
Biochemistry	Conducted experimental research into amino acids pool in different toxic states (alcoholism, drug intoxication, diseases) in different body tissues. Undertook studies into the binding, enzyme and enzyme complex kinetics.
Bio-medicine	Applied the multi compartmental model to drug absorption and resorption. Undertook statistical diagnostics (linear and non linear discriminant analysis) of different diseases- alcoholism and drug intoxication, stress, cancer etc.
Bio-mathematics	Investigated dynamic Optimal Control approaches to mathematical modelling of biological processes.
Math.statistics	Application of different statistical methods (simple & correlations, multivariate methods- regression, principal components, cluster, factor, discriminant, time series, etc.) to describe and model normal and pathological state of animal and human tissues and body. These techniques were also applied to pharmaco-therapy, to binding kinetics of low molecular ligands (oxygen, aldehydes, vitamins, inhibitors, metabolites) and to proteins (HSA, Hb).
Computers	Extensive experience in IT - Windows 95/98, NT, XP. Winword, Excel, Access, VB5/6, MathCad, Statgraphics, BMDP, Statistica, SAS, SPSS, Matlab. Some experience in network administration. Experience in Web design (sites www.bonescaffold.com, www.mathematicalbiology.com).

Present Research

Field of Research	Details
Tissue engineering and System Biology	Optimal control approach to System Biology approach to implant-tissue interaction. Development of mathematical models of bone turnover cycle incorporating Osteocyte loop of regulation. This model will be extended to enable hard scaffold design optimisation.

Planned Research

Field of Research	Details
Bio-mathematics	Application of Optimal Control approach to System Biology. Investigation of hierarchy of optimal control: Organism-Tissue-Cell-Biochemical etwork-Enzyme. Optimal Control/Variation analogies in Physics for Biology. Information reduction as a Optimal Control strategy
Tissue engineering	Tissue-scaffold adaptability optimisation. Math and statistical models of scaffold resorption and bone formation.